DOCUMENT RESUME

ED 400 947 PS 024 586

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TITLE Increasing Students' Responsibility for Their Learning through Multiple Intelligence Activities and Cooperative Learning.
PUB DATE May 96
NOTE 57p.; Master's Action Research Project, Saint Xavier University and IRI/Skylight.
PUB TYPE Dissertations/Theses - Masters Theses (042) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Academic Achievement; *Behavior Problems; Biology; Classroom Environment; Class Size; *Cooperative Learning; Delinquency; Discipline; Family Problems; High Schools; High School Students; Intelligence; Intervention; *Learning Motivation; Problem Children; Science Instruction; Self Esteem; Student Behavior; *Student Motivation; *Student Responsibility; Student Surveys; Truancy
IDENTIFIERS *Multiple Intelligences

ABSTRACT

Making students responsible for their own learning in biology is a national issue. The goal of this Master's project was to increase students' responsibility for their own learning in order to increase academic output and decrease the incidence of inappropriate behavior. The targeted population consisted of sophomore high school students in a biology classroom. The high school was located in a stable, urban blue-collar community in northern Illinois. The problems of academic output and inappropriate behavior had been documented by annotated teacher records, student records, and school records. Students also answered surveys designed to determine the causes for the students' lack of responsibility. Analysis of probable cause data revealed that students: (1) lacked intrinsic motivation and interest in science; (2) had low self-esteem; and (3) had possible family dysfunctions. Large class size may have contributed to the problem. A review of solution strategies suggested by knowledgeable others, combined with an analysis of the problem setting, resulted in the selection of the following categories of intervention: use of cooperative learning and employment of the theory of multiple intelligences. Post-intervention data indicated an increase in students' responsibility for their own learning through an increase in academic output and a decrease in the incidents of inappropriate behavior. (Three appendices contain a student classroom discipline record form and two student surveys. Contains 37 references.) (BGC)

INCREASING STUDENTS RESPONSIBILITY FOR THEIR LEARNING THROUGH MULTIPLE INTELLIGENCE ACTIVITIES AND COOPERATIVE LEARNING

by

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Submitted in partial fulfillment of the requirements for the degree of Master's of Arts in Teaching and Leadership

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Field-Based Master's Program

Action Research Project
Site: Winnebago, Illinois
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Abstract

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This report describes a program to increase student responsibility for their own learning in order to increase academic output and decrease the incidence of inappropriate behavior. The targeted population consisted of sophomore students in a stable, urban blue collar community, located in Northern Illinois. The problems of academic output and inappropriate behavior had been documented by annotated teacher records, student records, and school records.

Analysis of probable cause data revealed students: lacked intrinsic motivation, and interest in science; had low self-esteem, and possible family dysfunctions. Large class size may have contributed to the problem.

A review of solution strategies suggested by knowledgeable others, combined with an analysis of the problem setting, resulted in the selection of the following categories of intervention: the use of cooperative learning, and employment of the theory of multiple intelligences.

Post intervention data indicated an increase in student responsibility for their own learning through an increase in academic output and a decrease in the incidents of inappropriate behavior.

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Chapter 1

PROBLEM STATEMENT AND CONTEXT

General Statement of Problem

The sophomore students of the targeted biology class lack responsibly for their own learning. Evidence of this problem includes survey results, the number of discipline referrals, student records, and teacher journal entries.

Immediate Problem Context

The targeted high school, consisting of grades 10, 11, and 12, serves a total of 1,325 students. This is the only high school in the district. The majority of students are Caucasian; 7.4 percent are minorities. The percentage of students from families receiving public aid, living in institutions for neglected or delinquent children, being supported in foster homes with public funds, or eligible to receive free or reduced-price lunches is 9.1 percent. The high school has an attendance rate of 90.8 percent, a student mobility rate of 1.7 percent, a chronic truancy rate of 1.7 percent, and a dropout rate of 8.7 percent (Community School District 122).

This high school was built in 1974. It is a modern building with central air conditioning and carpeting in classroom areas.

The science classrooms, cafeteria, and the area around the gym are not carpeted. The only area without central air conditioning is the gym.

The school is divided into sections according to departments, ie. all the English classes are in one area, all art classes in another, etc. In addition, there is no common teachers's workroom or lounge. Due to this combination, there is little communication across departments.

There are 151 members of the faculty and staff. Administrative and support personnel include: a principal, associate principal, administrative assistant, dean of students, athletic director, psychologist, social worker, speech teacher, nurse, and two interpreters for those students who speak English as a second language. In addition, there are three counselors, one of them experienced in crisis intervention. The school has 11 secretaries, 5 paraprofessionals, a security guard, 4 resource workers, 6 supervisory aids, 1 librarian, 8 custodians, and 11 food service employees. The remainder of the staff are subject area teachers who are divided into 14 departments. The faculty within this school is 100 percent Caucasian.

In addition to the high school, the district has eight elementary schools, one junior high school, and one special education school. The average teaching experience for teachers and administrators is 17.3 years. Of the 348 teachers and

administrators employed by this district, 49.4 percent have a bachelor's degree; The other 50.6 percent are teachers with a master's degree or above. The pupil to teacher ratio for the high school is 19.3:1, while the district pupil to teacher ratio is 20.6:1. The pupil to administrator ratio is 300.3:1 (School District 122 State Report Card).

There are a variety of programs available for the high school students. These include student council, Project Planet, Key Club, Natural Helpers, Project IF, Geology Club, Business Leaders of America, golf, football, cross country, volleyball, soccer, spirit squad, cheerleading, basketball, swimming, wrestling, track, softball, and baseball. The targeted school also has a program for students who are having problems at school. There is a tutoring program for students. The teachers stay after school two to three nights a week to assist or tutor students in various subject areas.

The school also has a program for low-income students who are struggling in school. Gateway is a program that provides help with English, history, and math. The improvement of student self-esteem is a goal of the program. The school also has an incentive program called PRIDE. The program rewards students who miss less than three days of school in the quarter and have a G.P.A. of 3.0, or better or improved 1.0 or better than the previous quarter.

The targeted high school also has three academies: business, technical, and health oriented. Students in these programs are usually not college bound. These programs are designed to interest the students in different occupations in each field. Students are in a different building than the other high school students for four hours a day. At this school the students take math, English, physical education, and science, business, or technology classes, depending on which academy the student has chosen.

The Surrounding Community

The targeted school district is located in an urban area in northern Illinois, and services two communities. Each community averages approximately 17,000 people. Ninety-seven percent of the community population is Caucasian. The majority of individuals in these communities are blue collar workers. The percentage of individuals over the age of 25 who have graduated from high school is forty-two; Seven percent of those individuals have obtained a bachelor's degree or graduate/professional degree. The median family income for the two communities is $36,000 and is $17,200 for nonfamily households. The median house value for the area is $53,650 (Census of Population and Housing, 1990).

The district serves a total number of 6,306 students. The

administrators for the district include a superintendent, an assistant superintendent, an assistant superintendent for business services, and a director of human resources/labor relations. There are seven school board members, plus a school district attorney. The district spends approximately $4,798 per student, which is greater than most district this size which average $4527 per student; The mean spent in the state of Illinois was $5579 per student.

There are two nonprofit organizations that help support the school; the fan's club and the music boosters. Many businesses help support the school by donating prizes for those students who qualify for the PRIDE list each quarter.

Regional and National Context of Problem

Making students responsible in their own learning in biology is not only a concern of the targeted high school, but also a national issue. According to the United States educational goals for the year 2000, making the United States number one in science is a goal President Bush set for teachers. Students lack intrinsic motivation, especially in math and science. Reasons for lack of motivation include lack of self-confidence, low maturity level, family background, and past educational experience. According to Fort (1993), only five percent of Americans are "scientifically literate". Fort, as well as,

Groves (1995) believe that the problem is that students are "science shy".

Research has shown that the decrease in motivation is caused by more than one factor. Students' lives have changed since their parents were children. In 1979, when Weiner studied motivation, he identified ability and effort as two perceived causes of success and failure, but other causes included home environment, teachers, and a host of idiosyncratic factors, all falling under three categories: stability, locus, and control (Practical Applications of Research, 1982).. It may be that teachers do not stand a chance until the students are in control of their future. This means that students must value education highly, come to school prepared to learn, and take responsibility (control) of their actions.

Research has indicated that an increase in innovation will increase the motivation/responsibility of students. As McDaniel (1985, p.19) stated, "getting students to move: move toward instructional goals, move into academic learning, move forward in the acquisition of skills and values" is the teacher's job. McDaniel believes that by teaching an interesting curriculum with a positive, enthusiastic outlook will cause students to be motivated.

Researchers have debated the best way to motivate students. Some believe that internal rewards are enough. They believe that

feelings of success are enough to motivate students to work to the best of their ability. Other researchers believe that in order to motivate students, an external reward is needed. Some believe that telling the student "great job" is enough to motivate them to do it again. Others feel that you need to give larger rewards. This topic is constantly being researched, since motivation appears to be a constant struggle in education (Practical Applications of Research, 1982).

Reglin (1993) believes that the best way for teachers to motivate at risk students is by involving their parents in the educational process. This would motivate the children to achieve and behave better in school. He reminds us that often parents do not become involved in school due to bad experiences from their past. These negative feelings often have been passed down to their children. By involving those parents, the feeling for all parties involved would change.

Chapter 2

PROBLEM EVIDENCE AND PROBABLE CAUSE

Problem Evidence

In order to document the extent of students lack of responsibility in their learning, anecdotal records consisting of referrals to the dean of students, the number of parental contacts, the number of teacher/student conferences, and teacher observation over a four week period of time were noted.

Of the 28 students in the class, 23 were involved in this process over the four week time period. A discipline record form was developed by the researcher (Appendix A) to aid in the recording process. A summary of the number of incidents and behavior categories is presented in table one.

Table 1

Number and Categories of Discipline Observation

Behavior	Number of Incidents	Number of Students Involved
Cheating	8	6
No Assignment	95	18
Off-task	42	20
Truancy	36	9
Unprepared	26	12
Verbal Fights	12	7

Of 219 incidents recorded during the four week period, 207 incidents indicate failure to take responsibility for their own

learning. The following percentages were determined by dividing the number of incidents for a particular behavior by the total number of incidents. Twelve percent of the incidents involved students who were attending class without a pen, pencil, paper, homework assignments and/or a text book. Forty-three percent of the incidents involved students who had at least one missing assignment recorded in the grade book. Nineteen percent of the incidents were due to students being off-task, when assigned work in class. Ten percent of the students involved were caught cheating, half of them stated that he/she was only helping out a friend, while the other half stated that he/she did not have time to study or he/she forgot to take home the material to study. The students caught cheating informed the researcher that the penalty of no credit was too steep, since [they] "didn't do anything wrong. It's not [their] fault they didn't have time to finish their studying". Seventeen percent of the incidents involved students who were truant. The targeted class has the first of three lunch periods. The majority of these students extended his/her lunch period so that he/she could eat with a friend from a different lunch period. Thirty-two percent of the students in the targeted class lack the social skills to discuss their problems and differences. Fifty percent of the cases involved vulgar language; Sixty-six percent of those students informed the researcher that he/she didn't know what was wrong

with the language since he/she is allowed to talk that way in front of his/her parent(s). The results indicate that these students do not take responsibility for their own learning. It may be that their learning is not important enough to bring materials to class, bring materials home to study or finish homework. It appears that these students try to blame others for their mistakes.

Table 2

Number and Categories of Discipline Steps

Behavior	# of Student Conferences	# of Parental Contacts	# of Referrals
Cheating	8	10	2
No Assignment	95	18	0
Off-task	42	10	3
Truancy	36	3	3
Unprepared	26	8	0
Verbal Fights	12	7	4

The table represents the number of student conferences, parental conferences, and discipline referrals. Each incident resulted in a student/teacher conference. Some conferences were for only a few minutes after school, while others were before or after school. Ninety-five percent of the parental contacts were done by phone. Those students receiving referral(s) were already warned by the teacher and parental contact had been made. Fifty

percent of the verbal fights were first offenders who used vulgar language, which results in an immediate referral.

Probable Causes

To determine the causes for student lack of responsibility, the students answered a survey given, (Appendix B). In order to compare the results of the targeted group to other students, a group of students taking Modern Biology also responded to the survey (Appendix C). The Modern Biology students are the "average" students. Both groups had the same percentage of students involved in the survey. They had the same ethnic ratios and the same percentage of students from traditional and non-traditional families. All students were in sophomore level biology classes.

The students were asked how many hours each week they spend studying and working. Figure one represents the results.

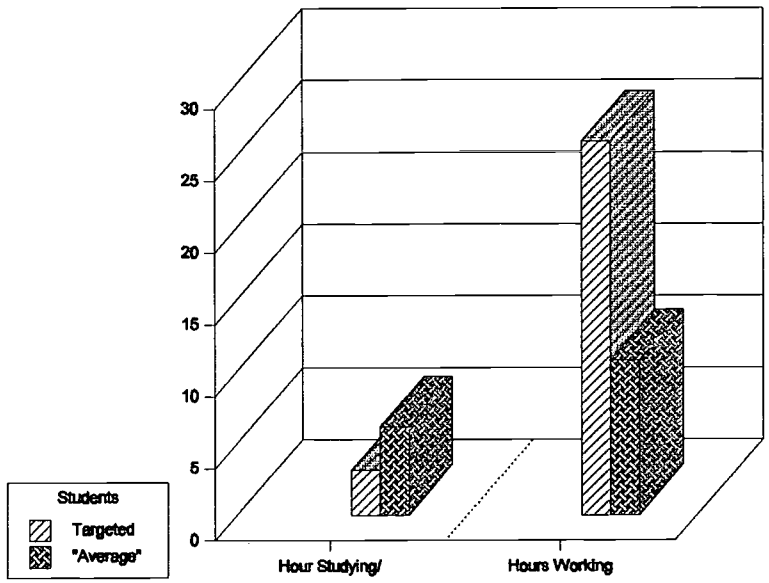

Figure 1

The Number of Hours Spent Working

Verses Studying

The targeted students spent 2.4 times as many hours working than the "average" group, while the "average" group spent almost twice as many hours studying than the targeted group. Several of these students work until closing, which can be as late as twelve o'clock on school nights. Many have informed the researcher that they cannot stay after school for additional help because of work and cannot meet before school due to a lack of a ride.

Figures two and three represent the importance the students have placed on education and their opinion of the relevancy of biology in their future.

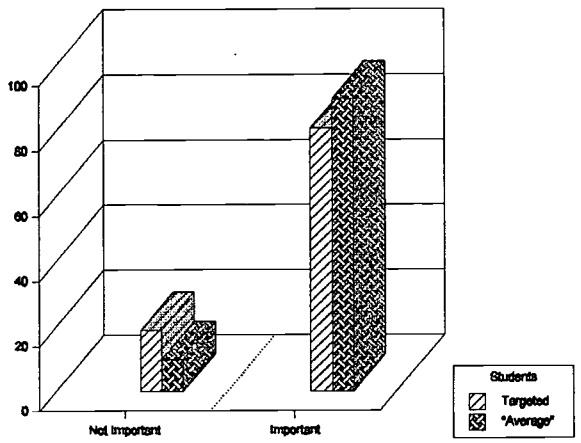

Figure 2

Importance of Education for One's Future

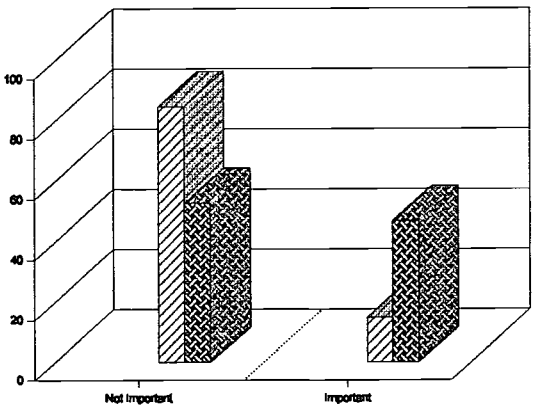

Figure 3

Relevancy of Biology to One's Future

Figure two reveals that both groups of students believe that education is important for their future success. Figure three shows that the majority of students do not believe that biology is relevant to their future. There were more students in the "average" class that indicated that biology is relevant to their future; many of these students also informed the researcher that they plan to find a career in the medical field, so biology would be more relevant to their future.

Table three represents the student responses when asked how influential different individuals are on their motivation to learn.

Table 3

Influential People on Motivation to Learn

Individual(s)	Not Influential (Targeted)	Influential (Targeted)	Not Influential ("Average")	Influential ("Average")
Parents/Guardian	34%	66%	26%	74%
Administrators	81%	19%	80%	20%
Teacher(s)	53%	47%	41%	59%
Self (Internal)	26%	74%	7%	93%
Other	13%	87%	20%	80%

Both groups indicated that their parents were influenced on their motivation to learn and that school administrators did not. There was a slight difference in the teacher motivation, but the difference indicated that the majority of the targeted students believed that teachers did not influence their motivation, while the majority of "average" students believed that teachers were influential. Intrinsic motivation supports the researcher's statement that students are not showing responsibility in their own learning. Twenty-six percent of the targeted students stated that they contained little, if any, intrinsic desire to be motivated to learn, while almost all of the "average" students believed that they were intrinsically motivated to learn ,only seven percent of the "average" group felt little, if any, internal desire to be motivated. Both groups indicated similar extrinsic motivators.

Targeted Students

"Average" Students

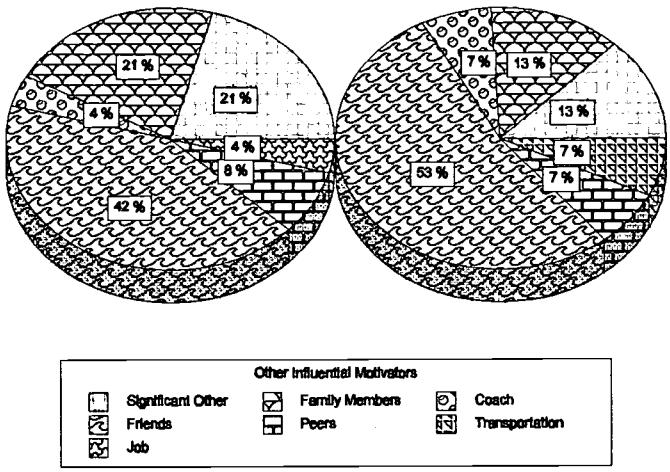

Figure 4

Other Influential Individuals

Both groups stated that other students are influential on their motivation. This includes peers and friends. Significant others were very influential for both groups. Uncle, brothers, sister, grandparents, and one's own children were individuals given in the family member group. These individuals were chosen as "pretty" or "very influential" individuals. The only differences between the two groups was that the targeted group also felt that their job influenced their motivation, while the "average" group indicated that grades were influential, since their insurance would go up, if the grades went down and that

would cause a decrease in transportation privileges. These results indicate that people who are closest to the students influence their decisions the most. If a student is not being motivated to desire education, the school will have difficulty making students take on the responsibility.

The literature suggest several causes for the students' lack of responsibility for their learning. A major cause is the changes in society. Brough (1990) reminds readers that if one is over twenty-five years of age, he/she was not concerned about AIDS, nuclear war, being kidnapped, divorce. In a poll given to eighth graders, each topic listed above was a concern to those students. Brough says that the Beaver Cleaver family is in the past and that families in which both parents work and single parent families are in the present. Parents who divorce often do not have time to deal with the emotions the child(ren) are facing. Consequently, these students cannot concentrate at school until the emotional weight is lifted. When students are coming to school, they are not prepared to start working. Many are concerned about choices dealing with substance use, sex, suicide, and possibility of them moving due to a divorce. These students are concerned about helping support their family. Some students are required to work in order to be supplied with every day necessities.

Television is affecting children of all ages. Atkinson (1988, p.26) states that "adolescents are easily swayed by peer pressure and outside influences, have been affected by the unifying power of television."

Chapter 3

THE SOLUTION STRATEGY

Review of the Literature

There are many different opinions on how to make students responsible for their own learning. Methods include: getting parents and the community involved in the students' education, creating a sense of being cared for, teaching respect and responsibility in school, restructuring schools by means of educating through programs, hands-on learning, the use of cooperative learning, and the use of multiple intelligences in the classroom.

Lickona(1992) believes that the school and parents need to work together and he does not stand alone in his beliefs about involving the parents in the student's education, in order to promote student responsibility. Goodman, Suttan, and Harkavy (1995), Reglin (1993), and Epstein(1992) agree with him. All of these individuals reflect the philosophy of the famous Chinese Proverb "It takes a whole village to raise a child". Schools cannot stand alone in providing a student's education. Teachers need the support from home, as well as from the community according to Epstein (1992). Schools can accomplish this through workshops and parent/teacher organizations. Goodman, Suttan, and Harkavy (1995) believed that through workshops the communication

between parents, schools, and the community will open. Reglin (1993) stressed the importance of making parental activities positive experiences, as most parents do not become active with their children's education because of their personal negative experiences at school. If all groups would work together, students may realize that it is their responsibility to learn.

Another way to improve students' responsibility for learning is by showing the students that you care. Noblit, Rogers, and McCadden (1995), and Bosworth (1995) reminded teachers that students need to feel that someone is there for them and on their side. In some cases, there is little communication among family members; Parents come home from work tired, not wanting to talk. In other incidents, the student only lives with one parent who is trying to do the job of two people. Sometimes the student lives with a parent who works the second shift. By the time the student gets home from school, the parent is at work. When the parent gets home from work, the students is in bed. Often students believe that they are always on their own, not cared for. By teachers showing students that someone cares, students may take more responsibility for their learning. Just standing at the door greeting students improves students behavior and academic performance. Talking to the student in a non-instructional manner is another way of showing you care. Sometimes, little things mean a lot.

Lickona (1992) and Kohn (1991) believe that it is the school's responsibility to teach values, which would include the value of education. Lickona believes that teachers should do this through a variety of techniques. One way is to work with the families. Lickona (1992, p.35) states "working together, these two formative social institutions have real power to raise moral human beings and to elevate the moral life of the nation". Besides the school and parents working together, he believes that the community as a whole needs to be a partner in each student's education. Creating a positive moral culture in the school is another part of this whole process. One can accomplish this through cooperative learning, teaching conflict resolution, moral reflection and developing the conscience of craft, which "calls on us to do our jobs well, whatever they may be"(p.213). The final piece to this process is caring beyond the classroom. This can be established through moral discipline, a moral classroom community which asks the teacher to be a model of what is expected, teaching conflict resolution, and by having the teacher be a care giver, model, and mentor. Kohn (1991) informs readers that one needs to move away from extrinsic motivation to intrinsic motivation. His goal is to make students responsible for their own learning. Teachers need to encourage commitment to values, whether individual or cooperative values.

Frymier (1974) also believed that educating students about the value of education is needed. He believed that we need to help children learn the following seven steps: to value learning, to want to learn, how to learn, to value knowledge, to acquire knowledge, to understand knowledge, and to behave according to knowledge. By teaching these seven processes, students will take on the responsibility of becoming an active learner. Educators cannot expect students to understand knowledge without valuing learning.

Cole and Schlechty (1992), Fogarty (1992), Hodgkinson (1991), Kretovics, Farder, and Armaline (1991), Leonard (1992), and Perry(1991) believed that the best solution for students is to restructure our schools. Cole and Schlechty (1992) reminded teachers that they are competing with television and computer games. Consequently, teachers need to be innovators, making students enjoy doing their school work. Cole and Schlechty believed that teachers need to incorporate the following eight human needs: recognition, intellectual variety, success, collegiality, power, freedom , fun, and belonging. They believed that by incorporating each of these needs into the curriculum, students will want to learn.

Fogarty (1992) believed that the key to student's success is integrating the curriculum. Students often believe that there is no connection between math, science, English, and history. They

believe that they have so much material to learn. Fogarty believed that if teachers made connections with the other subjects, the students will already be prepared to learn about the topic. Through prior knowledge and understanding, students will become more involved in discussions and help other students discover a better understanding of the topic.

Hodgkinson (1991) believed that the government needs to spend more money funding schools. He stated that by funding the schools to run at-risk programs, students can learn the importance of education. Hodgkinson explained that education is the "weapon" against poverty. He believed that taxpayers can either support these students when they are young, by spending money on programs or else spend it for welfare or the price to maintain prison.

Kretovics, Farder, and Armaline (1991) agreed with Hodgkinson and Frymier that education is the best way for students to become more responsible in their own learning. They believe that schools should develop an intervention/enrichment program that address the problems that under achieving and educationally disadvantaged students have. The program they discussed provided a "family" setting for these students. The result showed a professional growth in the teacher and an academic improvement in the students.

Leonard (1992) believed that a reform in education is needed. He felt that teachers are trying to change students natural human instincts. Teachers first mistake is not realizing that all human learn at different rates. Although it may take an individual a longer time to learn something, it doesn't mean that he/she is any less intelligent than the student who learns quickly. Secondly, teachers want students to work quietly and individually. Humans naturally turn to others in their time of need. Cooperatively people have become the creatures they are today. Thirdly, teachers often humiliate students when they do not have the correct answers. Humans need self-confidence and self-respect in order to be ready to learn. Leonard believed that teachers need to produce a positive environment that allows students to work at their own pace and with others when needed. He also stated that multimedia is needed in the classroom. Through computers, teachers will find more ease in providing the necessary learning environment.

Perry (1991) believed that schools need to begin work on the America 2000 program. At a conference in September 1991, 300 executives, educators, and politicians met for the fourth annual Fortune education summit. After a long discussion, they determined ways to "fix" our schools. One way is to require that certain classes be taken at certain times in order to do well on the tests that will determine how well students are doing on the

particular goal. Another way to "fix" our schools is to have businesses become more involved in student education. The businesses can help in a variety of ways. One way would be to donate money towards teachers and schools through grants. Schools alone cannot restructure the schools in order to meet America 2000. Another way businesses can help is by becoming involved in Tech Prep programs. Perry also encourages businesses to have incentives for engineers who are ready to retire to become math and science teachers. Through tech prep programs, students learn in a non-traditional setting. Some students need this type of learning environment.

Hands-on learning is important in all subject, but especially in science. Hassard (1990) was surprised with the discovery he has made. He stated the following:

> It became evident to me that an interesting, yet alarming paradox existed with regard to the teaching of science: small group, student involve or led, hands-on science lessons motivate students and help them understand science yet science lessons are usually teacher directed to groups of observers. (p. vii)

Teachers know that hand-on activities are important for students success, however due to expenses, time limitations, and students behavior, this process is often eliminated. Hassard

believed that through hands-on education, students will become more interested and become more active learners.

Ingram (1993) and Hancock (1988) agreed that hands-on activities help motivate students in learning. By performing hands-on activities, students use more of their senses, not just hearing and sight. Hancock (1988, p.3) stated that when teachers "teach science as a fixed knowledge to be learned, not challenged, we fail[ing] both our students and our subject". By involving the students in their education, students will begin to take on the responsibility necessary for them to succeed.

Cooperative learning teaches students how to work with others, the importance of being a responsible member of a group, and the ability to learn from others. Dishon, Wilson, O'Leary (1984) are a research team that believed in the importance of cooperative learning. Their research helped them discover the following:

> The evidence that cooperative learning, when compared with competitive and individualistic learning, results in higher achievement, greater achievement motivation, more positive attitude towards learning, more constructive relationships among students even when students vary in ethnic background and achievement levels, higher level reasoning processes, higher self esteem, and greater interpersonal competencies is no longer being ignored. (p. vii)

With cooperative learning, students learn about the subject matter, while learning to take responsibility. They also discover common ground among classmates.

Hassard agreed with Dishon, Wilson, and O'Leary (1984). Hassard (1991) believed that cooperative learning will benefit every student involved. The gifted student will have the opportunity to work as a facilitator, while the at-risk will have an opportunity to work in cooperative teams and receive help when needed. Hassard (1990) also informed us that cooperative learning "fosters learning, self-esteem, and positive attitudes"(49).

Johnson and Johnson (1988) strongly agreed with the importance of cooperative learning. They believed that through heterogeneity, the students would learn from one another. Students also learn to see things through the eyes of others. Some students would never take the time to get to know and work with someone who is culturally, mentally, or physically different than them self. Students learn that it is all right to have a different opinion or idea.

Manning and Lucking (1991) agreed with the research above. They believed that academic achievement improves because of individual accountability and the fact there is a team goal. They concluded that cooperative learning equally benefits the remedial, average ,and gifted students.

Not all students are the same, however education often treats them as if they were. Gardner (1993) explained that each person has different areas in which he/she performs better. This does not make one person smarter than another; It just proves that people have different strengths and weaknesses. Grady (1990) agreed with Gardner. Grady believed that teachers do not use activities that allow students to use their "whole brain". By unlocking a student's strengths, he/she will have more confidence. This will help students feel secure in taking a more active role in their education.

Although all the interventions listed above show accountability, cooperative learning and multiple intelligence as the interventions for making students responsible in their own learning. The goal is to make students active learners in the classroom.

Cooperative learning teaches students responsibility, especially when the instructor insists on individual responsibilities. Through cooperative learning, the students will have a greater understanding not only in biology, but also in human differences. Cooperative learning will improve social skill and hopefully self-esteem. If a students does not believe that he/she is capable of performing a certain task, he/she won't be capable of performing it. Another reason for choosing cooperative learning as an intervention is because scientists do

not work alone. They consult others as needed, so the students may as well begin to work cooperatively from the beginning. Cooperative learning has shown result of less discipline problems. Students are given the opportunity to communicate verses sitting quietly the whole hour. The individuals receive the attention of other students, so they are not causing scenes in order to have others notice him/her. By incorporating cooperative learning, the goal is to increase academic performance and decrease the incidents of inappropriate behavior.

There are several reasons for incorporating multiple intelligence. Many students do not learn best through a linguistic approach, however the traditional classroom expects students to learn linguistically. Secondly, if a students has a weakness in a particular intelligence, he/she has a strength in another. Thirdly, incorporating multiple intelligence would help students make connection with other classes. By bringing out the strengths of students, they will want to take responsibility to learn. By incorporating activities that access the seven multiple intelligences, students will feel as though they can succeed, thus preventing inappropriate behavior associated with students of low self-esteem.

Project Outcomes and Solution Components

Solutions suggested by professional literature combined with an analysis of the site resulted in the following terminal objective.

> As a result of the use of cooperative learning techniques during the period of September 1995 to January 1996, the sophomore students in the targeted Biology class will increase academic output and decrease the number of incidents of inappropriate behavior as measured by teacher records and number of referrals.

In order to accomplish the terminal objective, the following processes are necessary:

1. Material needed for cooperative learning will be collected.
2. Base groups and task groups will be established.
3. Lesson plans will be prepared and taught.

Through the utilization of multiple intelligences, the researcher will see a definite change in the student.

Solutions suggested by professional literature combined with an analysis of the site resulted in the following terminal objective.

> As a result of the use of activities that access multiple intelligences during the period of September 1995 to January 1996, the sophomore students in the targeted Biology class will increase academic output and decrease the incidents of inappropriate behavior, as measured by teacher records and number of referrals.

In order to accomplish the terminal objective, the following processes are necessary:

1. Materials needed to educate and inform students about multiple intelligences will be collected.
2. Multiple intelligences will be taught and modeled.
3. Lesson plans will be created and taught incorporating multiple intelligences.

Action Plan for the Intervention

I. Materials Needed

A. Cooperative learning

1. Base group lesson plans for roles, responsibilities, and team bonding.
2. Base group posters; markers, poster board, glue, glitter, etc.
3. Role cards.

II. Groups

A. Base groups will consist of 4-5 students.

B. The teacher will divide the groups into heterogeneous groups consisting of 1 advanced student, 1 remedial student and 2 or 3 average students. These groups will have males and females in each group.

C. There will be 2-4 students in each task group.

D. The task groups will be chosen by the teacher, the students, or random, depending on the task.

E. The base groups will be taught roles and responsibilities.

F. All of these tasks will be covered the first two weeks of school.

III. Model and Identify Multiple Intelligence

A. The teacher will introduce the theory of multiple intelligences.

B. The students' strengths will be determined.

C. The teacher and students will model the different intelligences.

IV. Lesson Plans

A. Cooperative learning

1. Plans will integrate subject matter and cooperative learning skills.

2. Roles and responsibilities will be taught to students.

3. Cooperative learning will be utilized 2-3 times a week during the intervention period.

B. Multiple intelligence

1. Lesson plans integrating Biology and multiple intelligence will be created.
2. Activities that access multiple intelligence will be used 1-2 times a week.

Methods of Assessment

In order to assess the effects of the intervention, the teacher will document the number of discipline incidences recorded and teacher referrals given during Biology. Grades will be used to determine the academic growth in biology.

Chapter 4

PROJECT RESULTS

Historical Description of Intervention

The objective of this project was to increase academic output and decrease the number of incidents of inappropriate behavior. The implementation of cooperative learning and integration of the seven multiple intelligences were selected to effect the desired changes.

Cooperative learning was used to teach responsibility and was also employed as an instructional technique in delivering subject matter content. The responsibility aspect was taught both directly and indirectly. When social skills were taught, students were taught the importance of doing their job. The base groups were established four different times. The first time was the first full week of school. The other three times were at the beginning of each quarter. This allowed students to meet more members of the class. The original plans called for two weeks to introduce roles and responsibilities. All of these were covered during the first week. Students were reminded of these roles and responsibilities throughout the intervention. During the first three sessions, students did not directly deal with biology content in their cooperative groups, however, they did deal with terms used in science.

While covering the multiple intelligences, assignments given were interpreted by students based on the seven intelligences. The instructor gave room for students to have some freedom in the task they performed. After students were introduced to the different intelligences, the students were given the opportunity to choose the intelligence that they felt most comfortable with. In order to have such open assignments, the teacher must have a rubric with the criteria written for student use before assigning the project.

The second full day of classes, students began working in cooperative groups. Students learned the expectations of the teacher, their responsibilities, and their groups responsibilities. Due to the fact that this is a high school class, many of the roles, duties, and social skills from previous experiences with cooperative learning were understood. Even though the roles were understood, students were not always performing all the group roles and duties. These roles, duties, and social skills were indirectly and/or directly practiced in the classroom daily to increase the students proficiency in these areas.

When the multiple intelligences were introduced during the first week of classes, students strengths and weaknesses stood out immediately. Many students were concerned about trying something new. "I can't" was a common phrase heard at first.

Soon, with class practice and teacher encouragement, the class phrase became "I will try." When a student worked in an area of strength, it was often difficult to move the student onto the next topic.

During the rest of the cooperative learning intervention, the groups worked a little better each time. During the second quarter, students began asking to meet with their base groups.

Once the students were taught about the multiple intelligences, at least once a week, an integrated lesson was taught. Approximately once every two weeks, an assignment was given that permitted student choice. This allowed students to cover the same material as the rest of the class, but in a manner that worked best for them.

The cooperative assignments started out "easy". For their cooperative learning lesson, students cut out puzzle pieces that would be used in order to make protein, carbohydrates, and lipids. They had to work together in order to finish the assignment on time. The students worked well together; They realized they needed one another's help.

Within each base group, students were assigned different macromolecule. The student drew the structure of the molecule and researched which food contained the substance. Students' drawings were hung in the class room as reference material. Students, for the most part, were excited about having their work

hung on the wall. They were even pointing out their drawings to family members during the schools learning festival, our open house.

When the targeted class covered cells, students had numerous questions. One cooperative assignment given was to use a KWL chart. The groups first filled in what they already **K**new about the topic. Then, they filled in what they **W**anted to know about the topic. At this time, each group member chose one item that they wanted to know. The member researched their question and reported it to the group. The next step included the whole class. Each group asked if anyone researched a question they didn't get answered. At this time, groups also shared anything they found to be interesting or unusual. Once this part of the assignment was complete, the groups filled in what they **L**earned about the topic. This was a bit difficult because some students went beyond the assignment and others did the bare minimum. It is believed that this is when group members began pushing each other to take on the responsibility to do what was expected of them.

During this same time, students were to create a three dimensional cell model. They could make this out of any material they wanted as long as it could not rot. The students were given a list of requirements like size and structures that needed to be labeled. Although there was a small group of students who did

nothing but complain that they were not creative enough to do the assignments, most students enjoyed the assignment. It was at this time when the targeted class started to ask for projects.

While covering biomes, students had a cooperative lesson that incorporated the multiple intelligences. Each group picked the name of a biome out of a beaker. Members of the group researched the topic, gave an oral presentation, and made visual aids. Some students wrote poems and songs about the biome, ecological models, t shirts, maps, drawings of native wild life, brochures, and one girl made a cheer about why one should love a temperate grassland area. To this day many students remember that cheer about the grasslands. This was exciting for the students because it gave them an opportunity to teach the topic in a way they felt comfortable.

A challenging unit for students to understand is mitosis and meiosis. Having students discover this together helps the process move more smoothly. Students started this unit by being introduced to the imformation through reading and lectures. Then students looked through microscopes at different stages of mitosis. Once the group members all agreed on the stage, the stage was drawn and the process of what was occurring at the time was written. Students had to listen to one another. The same assignment was given for meiosis. To complete the assignment, students made a Venn diagram showing what the two had in common

and what was different. At this point, students were finally working well together. They appeared to trust one another to take on the responsibility and complete the job assigned to them.

While covering deoxyribonuclic acid (DNA), students worked together to discover the process of DNA replication. There were puzzle pieces that were to be cut out so students who need to visualize what was occuring could. This lab had specific questions to be answered and some research needed to occur in order to answer everything. In a way, this was similar to the macromolecule lab given at the beginning of the year. The change among the groups was amazing. Students stayed on task, asked each other questions, and helped do more than the bare minimum. Students were trying to help students.

The genetic project given could be done cooperatively or individually, depending on the assignment. Students who made a video production or computer presentation/production on a genetic disorder could have a partner. Students who were writing a report or making a brochure, were to work alone. If the student wanted to do something not suggested, he/she needed to talk to the instructor. The students who worked alone turned in fine projects, however, those who worked with a partner definitely put more effort into the project. Students didn't want their group to do poorly because of them.

Presentation and Analysis of Results

In order to document the extent of inappropriate behavior, anecdotal records consisting of referrals to the dean of students, the number of teacher/student conferences, and teacher observations over a five month period of time were noted.

Table 4

Number and Categories of Behavior Observed

September 1995-January 1996

Behavior	Sept.	Oct.	Nov.	Dec.		Jan.
Cheating	6	4	4	4		2
No Assignment	85	70	90	63		91
Off-task	37	33	24	36		28
Truancy	30	19	15	16		10
Unprepared	25	23	26	21		29
Verbal Fights	8	6	6	7		15

Overall, there was a positive trend with this intervention. The month of January was more tense that the previous four, due to several reasons. January 2, 1996 started the targeted school's second semester. Since there were many schedule changes, the targeted class changed. Only forty-three percent of the students from first semester was also in that same second semester class. There were fewer incidents of inappropriate behavior in January than in August or September. I believe that

the transition between semesters was smoother. I accredit cooperative learning for this. Students worked in base groups which kept them on track.

Verbal fighting is one of three areas that had little change. Over the first four months there was a slight decrease in incidents of verbal fighting, however thirty-nine percent of the verbal fights occurred in January. A minority student joined the targeted class at the beginning of second semester. Many students had difficulty interacting with the minority student. This is one reason for changing base groups each quarter. Students could tolerate working with one another when they knew that there was a set period of time.

The other area with little change is with students being unprepared for class. There was a slight decrease in December, however December ends the first semester. Students tried turning in more assignments, if they felt that they had a chance to pass.

The third area of little change was those students who did not turn in assignments. There were three hundred and ninety-nine zeros in the grade book. Only sixteen percent of the incidents occurred in December because it was the end of first semester.

The number of times students were off task decreased during the first three months. The groups that worked the best together, were the groups who knew little about each other to

begin with. Groups that had close friends working together were often off task. Groups that disliked members from the beginning did not always take the time to listen to one another, causing individuals to go off task, since no one was paying attention to them. December was such a busy month with music concerts, Christmas parties, finals, etc., students had a tendency to get off-task. They would finish drivers education homework, try to write Christmas cards or party invitations, or talk to their friends.

Cheating had a constant decrease. Students realized the consequences for cheating and decided that they were better off getting partial credit for what they had done, rather than no credit for cheating.

Truancy decreased over the time of the intervention. Thirty-three percent of the truancy incidents occurred during September and only eleven percent occurred in January. Students claimed that they enjoyed coming to class.

Looking at figure 5, one can see that the actual number of incidents were fairly evenly spread over the five month period of the intervention.

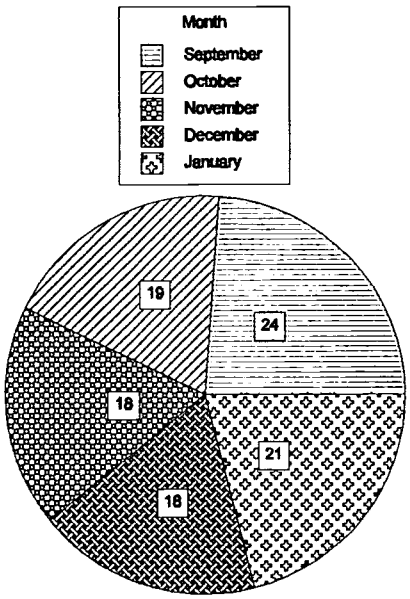

Figure 5

Percentage of Discipline Incidents
September 1995-January 1996

What cannot be seen is the change in attitude during this period of time. When the bell rang, students were in their seats ready to learn. There were days in which everyone came to class with a writing utensil, paper, and his/her book.

Figure 6 illustrates the number of incidents at the beginning of the semester compared to the end of first semester. There was a decrease in the number of incidents in every category from the beginning to the end of the semester.

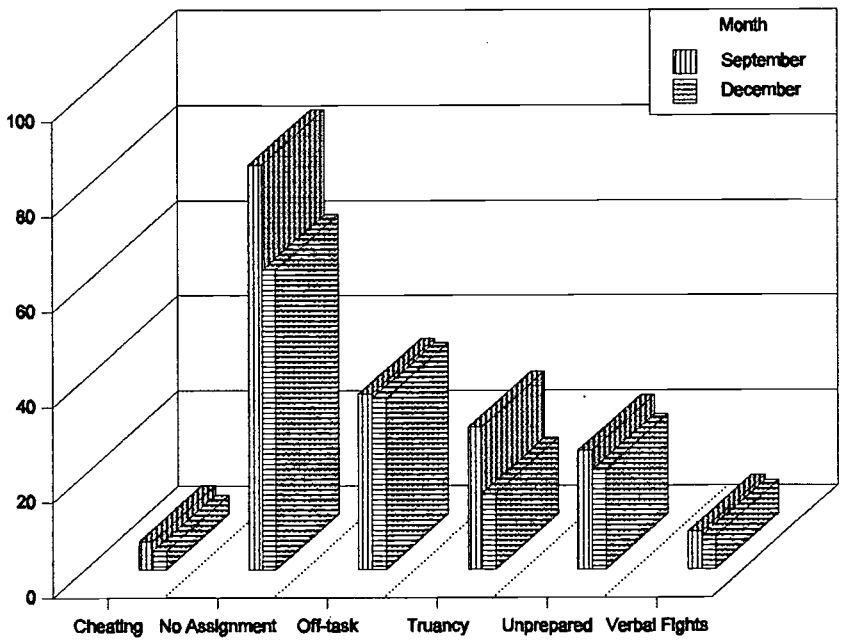

Figure 6

Categories and Number of Discipline Observations
At the Beginning of the Semester Compared to the End

Truancy dropped fifty percent during the semester. Being an active part of the class made a difference for many of these students. They were not expected to just sit and listen to the teacher talk all of the class time.

Conclusions and Recommendations

Based on the presentation and analysis of the data, the students' showed a marked improvement in behavior. The social skills learned during cooperative learning appear to have transferred to interpersonal behavior. The amount of teacher-time and energy devoted to intervening in student disputes was

reduced. Although the number of incidents for staying off-task did not change much, there was an increase in time on task, as well as academic engagement. Data cannot tell an individual all that has occurred. The targeted class tended to feed off of one another. Seldom was there only one incident per day. The targeted class would have many good days and then the whole class would have an off day. The cooperative learning environment had a positive influence on this class. When the targeted class had a substitute teacher, he commented on how polite and respectful the class was to him and to each other.

Although I believe that integrating the multiple intelligences into one's curriculum is important and something I will continue, I do not believe that it had much effect on these results. When students are asked what they liked about the class, they say that it is being allowed to work with others. Students also like the chance to talk. Students are just like everyone else; they like to communicate with others.

My recommendation is to incorporate cooperative learning. The teacher needs to be patient at first because often the most intelligent students tend not to enjoy working with others, friends see this time as social hour, and remedial students look at it as an opportunity to relax. If the teacher makes his/her expectations clear and follows through with what is expected, everything will fall into place.

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Appendices

APPENDIX A

Name _____

Hour ____

Student Classroom Discipline Record

	STUDENT ACTION	TEACHER RESPONSE
STEP I		
STEP II		
STEP III		
STEP IV		
STEP V		

APPENDIX B

Student Survey

1. On the average, how many hours do you spend doing homework each week? 3.15 hours/week

2. On an average, how many hours do you spend working at a paid job each week? 26 hours/week

3. What is your favorite subject? 14%-English, 14%-Math, 14%-Science, 13%-P.E.,11%-none,8%-Construction, 4%-Art, 3%-History, 3%-Keyboarding, 3%-Child development, 2%-WAVE, 2%-Choraleers, 2%-Computers, 2%-Offset printing, 2%-Study hall, 2%-Drivers Education

4. What subject is your least favorite?36%-Math, 19%-Science, 19%-English, 11%-History, 5%-Spanish, 5%-None, 3%-All, 3%-Computers

5. How much importance do you place on education as a necessity for your future success?

1	2	3	4
not important	slightly important	pretty important	very important
6%	13%	26%	55%

6. How relevant is biology to your future?

1	2	3	4
not important	slightly important	pretty important	very important
29%	56%	8%	7%

7. How much influence do the following people have on your motivation to learn? Please use the following scale.

1	2	3	4
not influential	slightly influential	pretty influential	very influential

A. Parent/Guardian	1	2	3	4
	8%	26%	27%	39%
B. School Administrators	1	2	3	4
	44%	37%	15%	4%
C. Teacher(s)	1	2	3	4
	21%	32%	35%	12%
D. Self (Internal Desire)	1	2	3	4
	14%	12%	32%	42%
E. Other _____	1	2	3	4
Friends, peers, Family, job, sport, Significant other	13%	0%	37%	50%

APPENDIX C

Student Survey

1. On the average, how many hours do you spend doing homework each week? 6.17 hours/week

2. On an average, how many hours do you spend working at a paid job each week? 10.8 hours/week

3. What is your favorite subject?18%-English, 18%-Science, 15%-Math, 8%-Forgein Language, 5%-Drivers Ed, 5%-P.E., 8%-Choir, 5%-None, 3%-Art, 3%-Drafting, 3%-Drama, 3%-Foods, 3%-Computers, 3%-Electronics

4. What subject is your least favorite?31%-English, 29%-Math, 12%-Science, 10%- History, 4.5%-Forgein Language, 4.5%-Business, 4.5%-All, 4.5%-None

5. How much importance do you place on education as a necessity for your future success?

1	2	3	4
not important	slightly important	pretty important	very important
10%	0%	26%	64%

6. How relevant is biology to your future?

1	2	3	4
not important	slightly important	pretty important	very important
15%	38%	30%	17%

7. How much influence do the following people have on your motivation to learn? Please use the following scale.

1	2	3	4
not influential	slightly influential	pretty influential	very influential

A. Parent/Guardian	1	2	3	4
	3%	23%	36%	38%
B. School Administrators	1	2	3	4
	30%	50%	20%	0%
C. Teacher(s)	1	2	3	4
	12%	29%	37%	22%
D. Self (Internal Desire)	1	2	3	4
	2%	5%	37%	56%
E. Other _____	1	2	3	4
Friends, significant other, family, peers, coach, car insurance	0%	20%	27%	53%

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